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Empirical Study of Project Governance among Chinese Project Management Professionals

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Abstract: Project governance (PG) represents a direct and control function for a project based organization (PBO). Operational approaches to PG have rarely been explored and structured. Based on a face-to-face questionnaire survey of project management professionals in China, this study produces an ontology of PG "direct and control" measures at the operational level. Mean value analysis confirms positive agreement among the research data and exploratory factor analysis indicates that four control subsystems predominate: normative management control; belief system; incentive mechanism; and risk governance. Confirmatory factor analysis validates these findings. Results serve as a foundation for future development of an operationally oriented PG model.

Keywords: Project governance, project based organization, direct and control, project governance approach

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1 INTRODUCTION

Recent studies have identified a gap between corporate governance (CG) and project management. Project management (PM) originated from system engineering and systematic optimization research that focused on the trade-off between time, cost and quality objectives; but has evolved to become substantially different from operations management (Bredillet 2010). PM concepts are increasingly used to achieve strategic objectives in rapidly changing business environments. Some models have been developed to link PM to corporate strategy and a common approach is the cascade model; which decomposes control structure from mission and strategy, through program and project, to the lowest level of activity (Youker 1993; Turner 2002). However, the challenge to ensure that projects align with business strategy remains.

Some researchers have approached this problem from the viewpoint of enterprise management. For example, by establishing an organizational PM committee or PM office, to oversee project activities and progress (Office of Government Commerce 2009). However, Pinto (2014) argued that in practice, these often constitute bottom-up systems of departmental or functional management and so only work well on smaller, or in-house projects (Renz 2007). Recent studies of multinational corporation management found that headquarters often experienced problems in controlling the activities of subsidiaries in worldwide operations (Engwall 2001). Marnewick and Labuschagne (2011) discovered that CG was unable to replace "project governance" (PG). There is a growing need therefore, to facilitate interfaces between this newer approach termed PG, and governance at corporate level.

PG therefore, encourages effective PM behavior, such that it harmonizes with organizational values, policies and regulations (Garland 2009; Müller 2009; Turner 2008). In our pilot study, the Chief Director of a Highway Construction Corporate stated that their company now implements a PG mechanism on all of its projects, to ensure that they meet both corporate strategy and stakeholders' values. The PG mechanism has therefore, achieved a foothold among Chinese infrastructure projects, but its key aspects and how they interact and perform are still not fully understood.

The Guide to the Project Management Body of Knowledge (PMBoK) describes PG as that which is able to supervise a project in accordance with the organization governance model through the whole project life cycle; providing a comprehensive, consistent method of control and ensuring its success by defining, documenting and communicating reliable, repeatable project practices. It includes a framework for making project decisions; defines roles, responsibilities, and accountabilities for the success of the project; and determines the effectiveness of the project manager (Project Management Institute 2000; Project Management Institute 2013). PMBoK also lists 11 PG framework elements, which are not systematically structured but overlapped. Previous research shows that PG has focused on governance structures, frameworks and models, and governance of the

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project process. It has not embraced practical tactics, which are closely linked to performance (Lu et al. 2015). PG approaches at operational level require further investigation and development if a systematic framework is to be developed. Two questions therefore underpin the present study: What are appropriate PG approaches? And, can they be represented as a structured model?

The study explores the notions of PG and "enterprise management" (i.e. "internal control") and how combined, they can ensure viable organizational PG. In contrast to Lu et al. (2015)'s work, this research starts from PG's direct and control functions. Taking account of this, the study proposes a conceptual PG framework that embraces four key elements; based on the premise that without effective organizational governance and management systems support, PG and management cannot operate effectively. A questionnaire survey determines project managers' levels of agreement on PG measures. Data were subsequently analyzed using mean values and exploratory factor analysis, before using confirmatory factor analysis to validate the model. Practical recommendations and suggestions for further research conclude the study.

2 LITERATURE REVIEW OF PG APPROACHES AND THEIR CONSTITUENTS

2.1 Project Governance

Current PM management systems, do not always promote project value achievement. The most important reason is that they focus on the project implementation process, without macroscopic and overall thinking (Andersen 2016). The project team need direction from upper levels of an organization, and this is particularly important for a cross-organizational project. Therefore, PG has aroused the attention of researchers, and become a frontier topic in PM research fields (Bredillet 2010).

There is consensus among the literature that PG developed from CG. The Association of Project Management considers PG to comprise corporate governance activities associated with projects (Association for Project Management 2012) and in this regard, CG is described as the institution dealing with principal-agent problems between shareholders and managers (Williamson and Ouchi 1981). However, PG is more complicated than this and so its definition displays inconsistency. One possible reason is its multiple levels of governance which including program, portfolio and individual projects, as well as numerous project stakeholders. However, if PG is traced up the project organization structure, it represents a vertical governance structure from project based organization (PBO) between the project manager and their team (Williamson and Ouchi 1981).

Organizational governance provides a framework for ethical decision-making and managerial action based on transparency, accountability, and defined roles (Müller 2009). PG hence provides structure - through which the project objectives of the project are set; the means of attaining these objectives are determined; and performance is governed (Turner 2006). Klakegg et al. (2008) suggested that a governance framework includes process, procurement model, decision-making, review techniques, and objectives. Too and Weaver (2014) contended that PG is the "management of project management" so it is necessary to investigate its operational level approaches to better understand its working mechanism.

2.2 Project Governance Approaches

Research has previously considered detailed measures of PM, such as governance approaches or measures (Ruuska et al. 2011). These were described as "governmentality" in Müller and Lecoeuvre (2014) and are taken to embrace a wide range of control techniques that apply to a wide variety of objects. PG has also been expressed as elements or factors in a variety of literature but a definitive, comprehensive list of these is difficult to find.

Müller and Lecoeuvre (2014) proffered 10 measures grouped under outcome control or behavior control; while Lu et al. (2015) divided PG into contractual and relational governance elements. Abednego and Ogunlana (2006) studied Indonesian PPP projects to propose eight factors, being: 1. making the right decisions at the right time (a form of active participation); 2. contract fairness; 3. information transparency; 4. responsive and timely decisional actions; 5. continuous control and monitoring to achieve common goals and satisfy all interests; 6. equality between all parties; 7. effectiveness and efficiency; and 8. accountability. Renz (2007) used key responsibility to describe PG. Hung (1998)'s work in identifying governance as linking, coordinating, control, strategy, maintenance and support, Renz (2007) developed six key responsibilities that integrate with each other: 1. system management (a societal embedding role); 2. mission management (strategic direction, support and control); 3. integrity management (normative support in downside issues); 4. extended stakeholder management (linking, coordination, control); 5. risk management; and 6. audit management.

Klakegg et al. (2008) investigated how the interface between governance and PM works for public projects through three case studies - whose detailed governance elements addressed the development of cost and time estimates. Their research also considered governance principles concerning cost estimation/control and systematic analysis of the effect of these principles. Governance principles of public projects were described as: establishing a common worldview and stabilizing rules of conduct; differentiation between projects based on complexity (etc.); and mechanisms to reduce complexity, distribute risk, and trigger governance processes in response to environmental turbulence (Klakegg et al. 2008). Ruuska et al. (2011) claimed there are several elements that shape the governance of a large project, including: contract structure; procurement organization; supplier management; risk sharing; project monitoring and coordination; external collaboration; and communication between project actors. Ten PG sub-dimensions evolved from Müller and Lecoeuvre (2014) that were empirically tested. These are: 1. decision-making; 2. remuneration; 3. legitimacy; 4. financial objectives; 5. long-term objectives for shareholder-stakeholder dimensions; 6. rule orientation; 7. level of control; 8. adherence to job descriptions; 9. role of support institutions; and 10. compliance expectations for behavior-outcome control dimensions.

Two principal schools of thought regarding governance were identified by Too and Weaver (2014). The first is that governance is a function of management or any entity responsible for making decisions and/or overseeing (controlling) the work of the organization or its projects. The second regards PG as a single process with different facets; whose functions of governance concern re-

lationships; change; the organization's people; financial aspects; and viability/sustainability. Lu et al. (2015) categorized PG into contractual and relational governance, where the former comprises fundamental elements, change elements and governance elements. Relational governance is represented by trust and relational norms that involve information exchange, solidarity and flexibility. These categories are similar to the concepts of "hard" and "soft" governance espoused by Walker et al. (2007). Hard governance refers to the specific rules, regulations and codes of conduct underpinning the project implementation process, and defines each stakeholders' responsibility/authority in the process of achieving goals. Soft governance concerns the mutual exchange mode between the two sides within a governance structure and project regulation of the governance body. The most important aspect of soft governance is a trade-off between trust and control (ibid.). Zwikael and Smyrk (2015) further enriched the theoretical mechanism of control-trust of project governance; suggesting that PG tends toward the external PBO environment and that it is important for PG to establish the accountability and specific duties of stakeholders clearly.

Overall, a project manager needs support that transcends executive level help - a working mechanism between CG and PM - confirming a need for PG in the form of a "process-oriented systemąŋ strategically directed, synthetically managed and holistically controlled, in an entrepreneurial and ethical way, appropriate to the singular, time limited, interdisciplinary and complex context of projects" (Renz 2007). Renz's six-system model echoes the essence of governance: setting direction and exercising control. Too and Weaver (2014) for instance, conceptualized PG as a set of nested governance and management functions. In most organizations, a steering group is the principal PG institution whose tasks include establishing the governance infrastructure; setting project goals; providing the means to achieve project goals; and controlling progress (Müller 2009). PG therefore, provides a comprehensive, consistent control/ motivational framework to ensure that project development aligns with organizational expectation.

This study adopted Too and Weaver (2014)'s suggestion that there are two functions for a PG system. The first concerns decisions regarding which projects the organization should approve, fund and support; and the second concerns oversight and assurance. This study concentrates on the latter function, to focus on PG approaches based on Biesenthal and Wilden (2014)'s theory of governance being a multi-level phenomenon. The research constructs these approaches hierarchically.

3 RESEARCH METHOD AND RESPONDENTS' DEMOGRAPHY

Prior to conducting a questionnaire survey for this study, a consultation exercise with three industry professionals determined their agreement on PG control subsystems and concomitant measures. The first participant was Board Director of a property operation company; the second was Director of Research and Development (R&D) within a production company; and the third was a project manager for a state-owned land development company. Based on the leading question of "How do you govern (or are you governing) your projects?" Thirty diversified answers were analyzed to conclude with 21 PG measures as shown in Table 1.

Questions on how project managers are under PG direction and control were consolidated into a questionnaire. The questionnaire was distributed at the seventh China PM Application and Practice Forum, held in Beijing. All questionnaire respon-

Table 1. PG control subsystems and concomitant approaches

Code	Statement of governance approach
Belief 1	Project selection is based on clearly defined strategic goals and creeds
Belief 2	In the process of PM, the company regards the behavioral norms of correct fundamental values
Belief 3	The company demands project members to behave in line with company 'norms'
Belief 4	The company encourages project managers to develop autonomy within the scope of the company's authority and rules
Belief 5	After top management has defined the project, it can only be modified with feedback
Norm 1	The company has an explicit regulatory framework and regulations on expected standards of behavior
Norm 2	The company sets clear spans of PM responsibility and ranges of authority
Norm 3	The company continually inspects and supervises project implementation and management
Norm 4	There are penalties for when project implementation behavior violates relevant regulations
Norm 5	In project process management, key performance indicators monitor and control project milestones
Norm 6	The company has explicit maximum limits of possible deviation in the process of PM
Norm 7	The company has specified a clear change process
Norm 8	Project outcomes and standards will remain unequivocal and unchangeable after project commences
Norm 9	The company sets up dedicated communication systems for exchanging project's internal and external information
Incentive 1	The company has incentives to encourage project members to strictly follow basic values as their beliefs
Incentive 2	The company has internal sanctions for when PM behavior contradicts its values
Incentive 3	There are certain incentive schemes for relevant project personnel to comply with rules
Incentive 4	The company determines rewards and sanctions for project members to reflect levels of project achievement
Risk 1	The company encourages different levels of staff to highlight any uncertainty relating to the project
Risk 2	The company encourages different levels of staff to supplement added value factors to the project
Risk 3	The company has stipulated the collective participation rules of decision activity

dents had led a project team and where possible, the principal researcher sat with each respondent during questionnaire completion to provide support if required. Respondent project managers and team leaders were asked about how they were governed by their corporation or boss. This yielded 62 completed questionnaires. To expand the sample, a further two surveys were conducted during an International Project Management Association (IPMA) C level certificate assessment in August 2014; and a PM saloon in January 2015, both in Xiamen, Southeast China. The combined, resulting 127 completed questionnaires were considered an adequate number for robust statistical analyses (Hair et al. 2011).

Two respondents were unwilling to give their ages or PM experience (Table 2) but among the remainder, 45 (35.4%) were under the age of 30; 55 (43.3%) were between the ages of 31 and 39; 21 (16.5%) were between 40 and 49; 3 (2.4%) were between 50 and 59; and 1 (0.8%) was over 60. Most respondents (32, 25.5%) held three to five years PM experience; 28 (22%) held five to eight years; 27 (21.3%) had between eight and 15 years; 17 (13.4%) held over 15 years; and those with less than three years comprised 21 (16.5%) of the respondent sample.

To investigate different perspectives on governance approaches between the nature of projects, statistical analysis was conducted among different project categories viz. i) those associated with construction engineering and infrastructure (classified as "traditional" projects); ii) "modern" projects that included IT development, information systems and R&D; and iii) "other" projects which included process reengineering, marketing, managerial and organizational innovations. The three sub-sample classifications comprised equal numbers, which facilitated analysis between them.

Regarding respondents' management level, data were skewed, only 12 (9.4%) of were senior (i.e. above project manager); while 55 (43.3%) were project managers and the remainder most likely team leaders (refer Table 2). This reflects hierarchical organization structure: with fewer senior managers or high-level decision makers. The main part of the questionnaire asked about how "bosses" control and motivate project teams (managers) to realize project goals. Questions were arranged under four topics that reflected Simon (2004)'s subsystems (belief, boundary, diagnose and control, diagnose and feedback). Questions were presented as a series of Likert items (Holt 2014) inviting respondents to choose a number from 0-5 based on their experiences where: 5 = completely agree on a statement; 4 = strongly agree; 3 = agree; 2 = disagree; 1 = strongly disagree; and 0 = completely disagree.

4 ANALYSIS AND RESULTS

There are three key aspects to the following data analysis: i) exploration of agreement on proposed project control approaches; ii) grouping approaches into the smallest number of meaningful categories based on factor analysis (to test Simon's four subsystems model); and iii) reliability and validity testing of the construct emanating from stage (ii).

4.1 Explanation of Governing Control Approaches and Their Ranking

Mean ranking is a convenient way to compare respondents' perceived importance of variables (Pell 2005; Holt 2014). Table 3 shows the ranking results of 21 PG control approaches. The

Table 2. Respondents' and projects' profiles

		Number of cases	Percentage (%)
Ages	>60	1	0.8
	50-59	3	2.4
	40-49	21	16.5
	30-39	55	43.3
	<30	45	35.4
	No mention	2	1.6
	Totals	127	100
Years of PM experience	>15	17	13.4
	8-15	27	21.3
	5-8	28	22
	3-5	32	25.2
	<3	21	16.5
	No mention	2	1.6
	Totals	127	100
Project types	New	46	36.2
	Modern	39	30.7
	Traditional	42	33.1
	Totals	127	100
Respondent's position	Project team leader	57	44.9
	Project manager	55	43.3
	Senior member in company	12	9.4
	No mention	3	2.4
	Totals	127	100

lowest value variable is "Project outcomes and standards will remain unequivocal and unchangeable after project commences" ($\bar{x}$ = 3.29). The narrow range among results ($\bar{x}$ = 3.29 to 4.01) suggests that all approaches were considered quite important for PG. The highest mean value variable is "Decision-making of project selection is based on clearly defined strategic goals and creeds" (belief 1) which belongs to "belief system". Two variables, "Company demands project members to behave in line with company 'norms'" (belief 3) and "In the process of PM, the company regards the behavioral norms of correct fundamental values" (belief 2) rank at second and fourth respectively. This indicates that the best governing measure for a successful project is to inspire principles of creed and value into project managers. This aligns with the theory that belief systems facilitate effective management practice (England and Lee 1974; Korukonda 1991) at least cost (Hechter 2008).

Table 3 also shows analysis of variance results from testing different opinions on the variables based on respondents' professional positions and types of project. Only a few variables demonstrate significant (p≤0.05) differences - four by types of projects and three by respondents' positions. Variables exhibiting different opinions based on types of project are as follows. Belief 3: "Company demands project members to behave in line with company 'norms"', Norm 1: "Company has explicit regulatory framework and regulations on expected standards of behavior", Norm 4: "There are penalties for when project implementation behavior violates relevant regulations", and Incentive 4: "Company determines rewards and sanctions for project members to reflect levels of project achievement". All of these achieved a higher mean value among "modern" projects, while the lower mean values relate to "new" projects. "Modern" projects are those with clearly defined goals and a governing body with strong institutional mechanisms (Turner and Cochrane 1993).

Three variables with significantly different means based on respondents' positions are; Belief 4: "Company encourages project managers to develop autonomy within the scope of the company's authority and rules", Risk 3: "Company has stipulated the collective participation rules of decision activity", and Risk 1: "Company encourages different levels of staff to highlight any uncertainty relating to the project". These three variables relate to innovation, and suggest that incentive schemes should encourage the creativity of project team members. Overall, respondents holding senior positions offered higher mean values than project manager/team leaders.

4.2 Exploratory Factor Analysis

To test the four piers of PG framework, an exploratory factor analysis abstracted key data components (Zhu 2011; Verma 2013). Cronbach's alpha calculated an estimate of internal consistency and indicated how well the items in a set correlate with one another (Brown 2001) (the consistency metric ranges between zero and one). In the early stages of research on predictor tests or hypothesized approaches of a construct, reliability of 0.70 or higher is satisfactory (Nunnally 1978), but for testing purposes it needs a value > 0.90. Cronbach's alpha was computed at 0.94, suggesting that survey data are highly interrelated, thus the experiment is repeatable and the scale is reliable (Norusis 1992). As part of the factor analysis, a correlation matrix of the 21 variables was computed and each was found to have a correlation coefficient > 0.30. This meant that there was no need to eliminate any of them prior to principal component analysis.

The Kaiser-Meyer-Olkin statistic is satisfactory for factor analysisat 0.85 (Kaiser 1974). Bartlett's test of sphericity tests the hypothesis that the correlation matrix is an identity matrix. In

Table 3. Survey results for governance control approaches

Control approaches				Different types of project		Different project participants	
Code	Means	STD	Rank	F	Sig.	F	Sig.
Belief 1	4.02	0.85	1	1.17	0.31	1.83	0.16
Belief 2	3.85	0.79	4	2.48	0.09	1.34	0.27
Belief 3	3.93	0.93	2	6.92	.001**	1.61	0.2
Belief 4	3.57	1	11	2.11	0.13	5.87	.004**
Belief 5	3.66	0.8	9	1.68	0.19	2.92	0.06
Incentive 1	3.37	1.1	20	0.6	0.55	0.01	0.99
Incentive 2	3.47	1.04	14	1.12	0.33	0.11	0.9
Incentive 3	3.44	1.02	17	1.18	0.31	1.51	0.23
Incentive 4	3.43	1.05	18	5.55	.005**	2.88	0.06
Norm 1	3.84	0.96	5	4.5	.013*	1.79	0.17
Norm 2	3.84	0.93	6	2.77	0.07	1.26	0.29
Norm 3	3.86	0.82	3	2.67	0.07	1.66	0.19
Norm 4	3.64	0.97	10	7.75	.001**	0.5	0.61
Norm 5	3.79	0.85	7	0.22	0.8	0.9	0.41
Norm 6	3.45	0.88	15	0.58	0.56	1.23	0.3
Norm 7	3.78	1.02	8	2.73	0.07	0.98	0.38
Norm 8	3.28	0.99	21	0.87	0.42	1	0.37
Norm 9	3.56	1.03	12	1.6	0.21	1.87	0.16
Risk 1	3.55	0.9	13	2.05	0.13	5.19	.007**
Risk 2	3.45	0.92	16	2	0.14	2.99	0.05
Risk 3	3.42	0.94	19	2.58	0.08	3.45	.035*

Note: **p≤0.01, *p≤0.05

this case, the sphericity statistic is large (1,290.05) and its significance level is small ($p < 0.00$): suggesting that the principal component matrix is effective (Wu 2009). The next stage generated Eigen values and a component matrix. This was imperfect because variables Norm 9: "Company sets up dedicated communication systems for exchanging project's internal and external information"; and Norm 8: "Project outcomes and standards will remain unequivocal and unchangeable after project commences", achieved weightings < 0.50. These results suggest that they did not belong to any extracted factors and should be removed.

Subsequent analysis therefore, considered 19 governance control approaches. The new initial and rotated matrix results are shown in Table 4. The second, third and fourth columns of the table are the initial matrix, and the next three columns show results of extraction based on Eigen values > 1.0, using the default method. The factors are listed in descending order of variance explained and $> 63\%$ of the total variance is attributable to the first four factors - a minimum requirement for social research (Hair et al. 2011).

The right three columns of Table 5 show rotated factor loadings. Notably, rotation does not affect the goodness of fit of a factor solution (Norusis 1992); the cumulative percentage of the six main components is equal after rotation; and the Eigen value/percentage of variance accounting for each factor does change. Table 5 shows the factor groupings based on varimax rotation.

4.3 Reliability and Validity of the Model

The exploratory factor analysis produced a four-dimensional PG control model, represented by normative management control, belief system, incentive mechanism, and risk governance. Reliability and validity analysis was conducted to test if the survey data fit with the measurement model. Reliability concerns the quality of measurement in terms of "consistency" or "repeatability" - with consistency represented by Cronbach's Alpha coefficient. Internal reliability relates to the degree of internal consistency testing with the same variable; while external reliability measures consistency between results using the same questionnaire item on the same objective at a different time (also known as "retest reliability"). This research did not involve repeated measurements of the same objective so external reliability was irrelevant.

Since the questionnaire statements were developed from interviews, validity tested the association between theory and empirical evidence. This analysis used AMOS (Wu 2009) to test construct validity; a measure typically represented by convergent, discriminant and nomological validity (Hair et al. 2011). Convergent validity indicates high correlations between all items measuring the same latent variables of the questionnaire using a Standard Load Factor (SLF), Average Variance Extracted (AVE), and Composite Reliability (CR) (Wu 2009). This study used a matrix comprising latent variables' squared root of AVE and the correlation coefficients between the latent variables to test the discriminate validity. If this measure is higher than the remaining correlation coefficients, it shows that the questionnaire has good discriminant validity (ibid.).

Results are shown in Table 6. The first column lists the four constructs. The second lists Crobach's Alpha coefficients, which are all > 0.7 and therefore above the acceptable level (Hair et al. 2011). Column four shows the Corrected Item-Total Correlation (CITC) - only six items have CITC value over 0.70. Fourteen items have a value between 0.5 and 0.7. Where CITC value is <0.5 it should be deleted from the final model (Hair et al. 2011). The fifth column is the standardized factor loading (SLF), similarly required to be > 0.7 for a good model, although < 0.5 is unacceptable (Hair et al. 2011). The failed item is Belief 4 - implying this is a unique component.

The sixth column shows AVE (minimum value should be > 0.5). Two principal factors (normative management control and belief system) are below this value. In normative management control, if the item Belief 4 is deleted, the responding AVE value increases to 0.49, that is, close to 0.50. However, the deleting of defective results under "belief system" is still unable to improve its AVE over 0.5. This indicates there is some room for improvement in PG research. The acceptable results are construct reliability (column seven). These are all greater than 0.7, which indicates internal consistency in the four components, meaning that the measures all consistently represent the same latent construct (Hair et al. 2011).

Discriminant validity is tested by the matrix in columns eight to 11. There are three factors (normative management control, incentive mechanism and risk governance), whose root squares of AVE are greater than the correlation coefficient between principal factors. The belief system factor's root square of AVE is less than the correlation coefficient between other factors; implying that the questionnaire inaccurately measured "belief system" and that therefore, the test statement should be revised for future research. This might be difficult since belief is strongly associated with value, culture, customs, and convention. These vary among industrial and national backgrounds (England and Lee 1974; Korukonda 1991).

5 DISCUSSION AND INTERPRETATION

This explorative study has also derived four factors that reinforce the pilot study results. The first factor is defined "Normative management control". All of its seven variables are associated with the process or behavior of management; indicating that PG is essentially "PM". The second factor was defined "belief system" following the original assumption that it refers to the value, creed, behavior, tradition, culture (etc.) of an organization, thereby influencing management issues in either implicit or explicit forms. The third factor was defined "incentive mechanism", which is popular in CG and principal-agency theory. Incentive schemes also help influence managers and encourage efficient operation. The final factor was defined "risk governance" and broadly represented variables relating to risk/opportunity management.

5.1 Normative Management Control (NMC)

Norms are rules that pre- and proscribe behavior in social situations (Hechter 2008). The analysis shows that "normative management control" includes management process control and boundary control. This result reflects the Project Management Body of Knowledge and much other literature relating to the PG concept. The factor accounts for 19% of the total governance control variance and comprises: Norm 7: "Company has specified a clear change process" (Sig. = 0.82), Norm 1: "Company

Table 4. Total variance explained

Component	Initial eigen values			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.63	40.15	40.15	7.63	40.15	40.15	3.58	18.82	18.82
2	1.88	9.9	50.05	1.88	9.9	50.05	3	15.76	34.58
3	1.39	7.32	57.37	1.39	7.32	57.37	2.86	15.03	49.62
4	1.15	6.06	63.43	1.15	6.06	63.43	2.62	13.81	63.43
5	0.93	4.91	68.34						
6	0.88	4.66	72.99						
7	0.75	3.96	76.95						
8	0.64	3.38	80.34						
9	0.53	2.8	83.14						
10	0.48	2.54	85.68						
11	0.46	2.43	88.12						
12	0.44	2.3	90.42						
13	0.41	2.17	92.58						
14	0.36	1.87	94.46						
15	0.28	1.49	95.95						
16	0.24	1.26	97.21						
17	0.23	1.2	98.42						
18	0.17	0.87	99.28						
19	0.14	0.72	100						

Extraction Method: Principal Component Analysis. Norm 8 and Norm 9 were dropped for low loading.

Table 5. Rotated component matrix[a]

	Component			
	1	2	3	4
Norm 7	**0.822**	0.137	-0.013	0.07
Norm 1	**0.761**	0.121	0.135	0.295
Norm 2	**0.734**	0.126	0.368	0.03
Norm 6	**0.612**	-0.107	0.08	0.468
Norm 3	**0.606**	0.422	0.342	0.001
Norm 4	**0.57**	0.262	0.37	0.033
Norm 5	**0.558**	0.437	-0.052	0.191
Belief 2	0.264	**0.712**	0.245	0.21
Belief 5	0.042	**0.701**	0.228	0.124
Belief 1	0.245	**0.637**	0.259	0.057
Belief 4	0.024	**0.591**	0.076	0.441
Belief 3	0.238	**0.558**	0.293	0.267
Incentive 1	0.161	0.286	**0.817**	0.087
Incentive 3	0.148	0.315	**0.745**	0.188
Incentive 2	0.06	0.24	**0.639**	0.23
Incentive 4	0.279	0.023	**0.631**	0.406
Risk 1	0.055	0.204	0.269	**0.784**
Risk 2	0.14	0.344	0.225	**0.761**
Risk 3	0.257	0.183	0.132	**0.7**

[a]Rotation converged in six iterations.
Extraction: Principal Component Analysis.
Rotation: Varimax with Kaiser Normalization.

Table 6. Reliability and construct validity analysis for PG control dimensions

Constructs	Cronbach's alpha	Item	CITC	Standard loading (SLF)	AVE	CR	Normative management control	Belief system	Incentive mechanism	Risk governance
Normative Management Control	0.860	Norm 7	0.674	0.713	0.473[a]	0.861	0.688			
		Norm 1	0.727	0.777						
		Norm 2	0.691	0.772						
		Norm 6	0.530	0.559						
		Norm 3	0.675	0.740						
		Norm 4	0.546	0.618						
		Norm 5	0.564	0.600						
Belief System	0.788	Belief 2	0.699	0.795	0.490[b]	0.790	0.670**	0.658[c]		
		Belief 5	0.549	0.601						
		Belief 1	0.538	0.606						
		Belief 3	0.593	0.682						
		Incentive 1	0.766	0.860						
Incentive Mechanism	0.816	Incentive 3	0.716	0.846	0.555	0.830	0.598**	0.732**	0.746	
		Incentive 2	0.535	0.613						
		Incentive 4	0.544	0.625						
		Risk 1	0.738	0.896						
Risk Governance	0.828	Risk 2	0.754	0.849	0.641	0.840	0.531**	0.686**	0.612**	0.800
		Risk 3	0.576	0.631						

[a,b]Below the minimum requirement of 0.5. [c]Square root of AVE smaller than the correlation coefficient. Two-tailed significance reported for the correlationcoefficients. Square root of AVE for each latent construct is given in diagonal. p**<0.01.

has explicit regulatory framework and regulations on expected standards of behavior" (0.76), Norm 2: "Company sets clear span of PM responsibility and range of authority" (0.73), Norm 6: "Company has explicit maximum limits of possible deviation in the process of PM" (0.61), Norm 3: "Company continually inspects and supervises project implementation and management" (0.60), Norm 4: "There are penalties for when project implementation behavior violates relevant regulations" (0.57), and Norm 5: "In project process management, there are key performance indicators to monitor and control project milestones" (0.55).

NMC typically takes the form of explicit rules, regulations, and ethical codes of conduct to control employees' behavior throughout project life cycle. Violation of these can bring serious loss to the company either economically or with regard to reputation. Governance also has a directing function to keep projects viable in the case of dilemmas. Project change often results from uncertain environments, whose impact can be significant and affect project operation or progress. Initial plans can be influenced by external and internal uncertainties, calling for clear instruction from PG. This may also require a change management framework, typically informed by the governance board, because inconsistent change process management can produce disruptive effects (Motawa et al. 2007). Hwang and Low (2012) confirmed that such frameworks are more prominent among larger companies, which tend to implement intensive change management.

Compared with a CG auditing system, PM prefers more "immediate" measurement to monitor project progress. Earned value management is an appropriate tool in monitoring time and cost performance but this needs timely and accurate data that might be difficult to collect in some situations. Drucker (2009) suggested that "what is measured improves" and KPIs are often appropriate for PM as a means to assess performance. All projects should have an approved plan authorizing points at which the business case is reviewed. Decisions therefrom should be formalized to provide legitimacy of governance actions (Office of Government Commerce 2009). The project board should monitor how work is assigned and undertaken; deal with issues; report progress; and take corrective actions to ensure that project development remains within tolerances. Therefore, effective governance should develop compliance "norms" and assess these through a continuous inspection process.

5.2 Belief System

PG promotes both explicit and implicit facets of an organization's mission. The explicit aspect refers to structures, processes, policies, regulations, and so on; while the implicit aspect concerns governors' influence via people's thinking (value, creed, culture, habit, etc.). This grouping supports Müller and Lecoeuvre (2014)'s statement on which GoP should be self-responsible, self-organizing. This component consists of five variables and accounts for 15.76% of total loadings. Belief system variables are: Belief 2: "In the process of PM, the company regards the behavioral norms of correct fundamental values" (Sig.=0.71), Belief 5: "After top management has defined the project, it can only be modified with feedback" (0.70), Belief 1: "Decision-making of project selection is based on clearly defined strategic goals and creeds" (0.63), and Belief 3: "Company demands project members behave in line with company 'norms"' had a lower loading (0.55).

The duties of CG not only guide activities through norm regulation, but also via implicit constraints (culture and industry customs); so a belief system aids organizational project alignment. However, tolerance is necessary whereby decisions made by senior managers may change. The project board is responsible for overall direction of a project within corporate constraints, but may not be involved on a day-to-day basis. Project in Control Environment (PRINCE2TM) recommends that direction

and management be separated (Office of Government Commerce 2009). For instance, because once a project enters its execution stage, a governance board has less "first-hand" knowledge than that of the project manager(s).

PG as a subject is largely divorced from company leadership and management. It is not just about board composition, but also about the board's policies and working style as influenced by the parent organization. Each governance member should ensure managers act within value guidance (including ethics). The collapse of Enron is an example of where a belief system failed. Enron's governance malfunctioned due to neglect of company ethical issues (Huse 2003).

5.3 Incentive Mechanism

The third principal factor is 'incentive mechanisms' which is responsible for 15% of total variance. The principal factor includes variables Incentive 1: "Company has incentives to encourage project members to strictly follow basic values as their beliefs" (Sig.= 0.81), Incentive 3: "There are certain incentive schemes for relevant project personnel to comply with rules" (0.74), Incentive 2: "Company has internal sanctions for when PM behavior contradicts its values" (0.63), and Incentive 4: "Company determines rewards and sanctions for project members to reflect levels of project achievement" (0.63).

PG can be explained through principal-agent theory, whereby the project manager and team members are the assumed agent. In general, the agent's compliance with the principal's directives can be achieved using incentive-compatible contracts (Hechter 2008). Because of their seniority and associated demands on their time, project owners or executive members might not involve themselves meaningfully at project level: consistent with principal-agent theory, they may delegate accountability for benefit realization to others. The establishment of such agency arrangements shifts project decision-making to the implementers, but delegation of this nature forces a degree of decentralization on the parent organization (Zwikael and Smyrk 2015).

The first variable relates to an organizational incentive alignment device to address the agency issue and provide for project managers to have honor, monetary reward, promotion, or even ownership. Such incentives are witnessed in social governance to establish moral exemplars. The governance body must ensure that parent organization values are accommodated by the project. Where this does not happen, the parent organization may have to move to protect its own values through drastic action; a consequence of which means the project might be redefined or the project manager reprimanded. The statistical results indicate that there is a diversified opinion about PG, as supported by Williams et al. (2010).

5.4 Risk Governance

Risk governance takes account of the complex web of actors, rules, conventions, processes, and mechanisms concerned with how relevant risk information is collected, analyzed, and communicated, it is therefore, wide-ranging (Hermans et al. 2012). The three variables under this factor are Risk 1: "Company encourages different levels of staff to highlight any uncertainty relating to the project" (Sig.= 0.78), Risk 2: "Company encourages different levels of staff to supplement added value factors to the project" (0.76), and Risk 3: "Company has stipulated the collective participation rules of decision activity" (0.70).

Uncertainty and unforeseen risk will always emerge since a project is dynamic. Many organizations have developed risk management strategies of which the first task is to identify risks, including source, probability, impact, detection and possible mitigation methods. Risk governance also provides opportunity; incentive systems can encourage project members to identify value-adding factors through comparison of benefits versus costs, and opportunities versus risks. However, project value-adding attributes are not always fully recognized; or may be "misunderstood". Following project commencement, more detailed project information will be exposed, thereby offering increased opportunities to explore value creation (Winter and Szczepanek 2008).

Collective decision-making is preferred to balance risk and opportunity, implying that the project owner and senior managers welcome collective decisions because these are superior to individual decisions. Collective decision-making also encourages additional cooperative activities such as brainstorming.

6 CONCLUSION

Much literature has focused on the concepts, structures and models of project governance but the aspect of how PG interfaces with project level governance (and thereby corporate governance) lacks research and hence grounded theory. This study developed an operational framework for PG to address this. Measures were summarized from interview with industrial professionals and further empirical study involved face-to-face questionnaire surveys. Exploratory factor analysis of resulting data enabled an ontology of PG "direct and control" measures at the operational level comprising a model of four subsystems viz. i) normative management control; ii) belief control; iii) incentive mechanism; and iv) risk governance.

The model embraces much theory regarding the concept and connotations of governance. For instance, by: providing a framework for decision-making and managerial action; achieving clear distinction between ownership and control of tasks; setting the boundaries for management action; defining the goals of an organization and the means by which they should be attained and the desired managerial processes to control areas of responsibility.

The findings are of utility to both practitioners and academics in three ways. That is, by:

1. Describing a model of PG that utilizes a practical framework linking CG and PM.
2. Emphasizing how control plays a superlative role - along with direction - to achieve desired project outcomes. These key elements of PG control relate to generic projects and most of them harmonize with practical guidelines (such as within PMBoKTM and PRINCE2TM).
3. Employing exploratory factor analysis to yield a four subdimension model representing PG control. This may be described in simple form as a "belief-norm-risk-incentive" model - symbolizing an expansion of the existing "control-trust-risk" model within extant literature.

The above framework will be helpful for project-oriented organizations to develop effective PG regimes in striving for effective project performance. The research also advances theory to the "void" that has existed between CG and PM - its theoretical im-

plications relate to "bottom-level" governance; in contrast to the "middle-level" that has formerly been expounded by scholars.

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